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COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
WASTE WATER USE FOR FEED CROPLAND (ISPOL'ZOVANIYE STOCHNYKH VOD--ETC(U)
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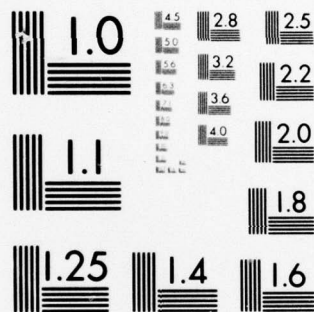
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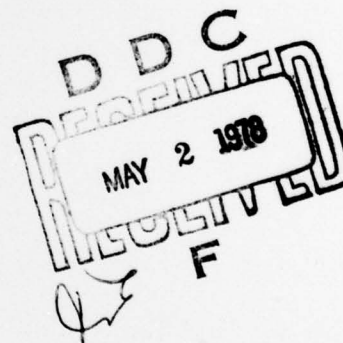


WASTE WATERUSE FOR FEED CROP LAND

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N.A. Kovaleva et al.

April 1978



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CORPS OF ENGINEERS, U.S. ARMY
COLD REGIONS RESEARCH AND ENGINEERING LABORATORY
HANOVER, NEW HAMPSHIRE

DRAFT TRANSLATION 673

71 Apr 78

72 6p

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ENGLISH TITLE: WASTE WATER USE FOR FEED CROPLAND

FOREIGN TITLE: (ISPOL'ZOVANIYE STOCHNYKH VOD DLYA OROSHENIYA KORMOVYKH UGODIY),

10
AUTHOR: N.A. Kovaleva, et al L.F. /Mikhneyeva,
M.I. /Demina

21
Draft trans. of mono.

SOURCE: Kupavna, Ministry of amelioration and water utilization,
All Union Scientific Research Institute for Utilization
of waste water in agriculture, 1976, 4p.

14 CRREL-TRANS-673

Translated by Office of the Assistant Chief of Staff for Intelligence for
the Office of Corps of Engineers, 1978, 3p.

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WASTE WATER USE FOR FEED CROP LAND

Kupavna ISPOL'ZOVANIYE STOCHNYKH VOD DLYA OROSHENIYA KORMOVYKH UGODIY
in Russian 1976 pp 1-4

[Prospectus by Candidate of Agricultural Sciences N. A. Kovaleva,
Candidate of Agricultural Sciences L. F. Mikheyeva, Junior Scientific
Associate M. I. Demina]

→ One of the effective means for upgrading fodder-producing areas is to irrigate them with waste water.

→ The experience of farms in Moscow, Leningrad, Kaliningradskaya, Volgogradskaya, and other oblasts in the RSFSR, the Ukrainian SSR, Latvian SSR and others indicates that meadows and pastures irrigated with sewage water grow 7,000-10,000 fodder units per hectare. *over to p. 3.*

Fodder crop land could be suitably irrigated with residential waste water, waste water from the food industry (sugar, starch, yeast, brewing and other industries), some types of textile industry waste water, and waste water from livestock breeding complexes and farms, treated in accordance with sanitary requirements.

The waste water released by different projects considerably varies in terms of chemical composition, presence of specific substances and hygiene indicators. This must be taken into consideration in treating the waste water for the irrigation of fodder crop land in different natural conditions.

Biological ponds provide good preparations for and high level decontamination along with artificial biological treatment systems. The structure of biological ponds is particularly adequate for the waste water of small settlements as a means for the treatment of waste water for the irrigation of fodder crop land.

Sprinkling is the best method for irrigation with waste water of farmland planted in perennial grasses, while furrow irrigation is most successful among the surface methods. It has been established that meadows may be irrigated with waste waters both in and out of season. The combination of seasonal with nonseasonal irrigation increases crop yields and creates conditions for the year-round reception and distribution of waste water.

Depending on soil and weather conditions, the seasonal irrigation norm may range from 200 to 500 millimeters with 4 to 7 waterings of 40 to 50 millimeters each. Unseasonal irrigation norms are for single applications, also depending on soil conditions. For example, the norm ranges from 200 to 250 mm for sandy loam and light loamy soils, dropping to 100 mm for heavy soils. Early spring grass irrigation would be expedient as it has fertilizing warming qualities which positively affect the grass growing periods.

The system used in seasonal irrigation with waste water is similar to clean water irrigation. However, in this case irrigation must be coordinated with the grass stand utilization system. Taking into consideration hygienic requirements under Nonchernozem conditions, pasture grazing or mowing should be allowed no less than 14-15 days after irrigation.

The application of chemical fertilizers would be expedient with a view to maintaining the high productivity of fodder crop land irrigated with waste water. Chemical fertilizer uses should be based on the existence of nutritive substances in both the water and the soil. Studies done by the VNISSV [All-Union Scientific Research Institute for the Agricultural Utilization of Waste Water] have shown that in order to obtain yields of 400-500 quintals per hectare the following amounts of chemical fertilizers per hectare of soddy-podzolic sandy loam soils irrigated with city waste water would be required: nitrogen, 200 kilograms; potassium, 180 kg; and phosphorus, 100 kg. It would be expedient for the chemical fertilizers to be applied together with the irrigation water.

Pasture rotation with mowing and grazing utilization of the grasses must be applied at meadow grass-pasture farmland irrigated with waste water with a view to maintaining its high productivity over a lengthy period of time and to improving sanitary condition of the pasture land. In this case strips must be adequately set aside for grass mowing throughout the entire grazing season and for alternating mowing with grazing, extending to 30-35% of the entire area.

Five to six grazings may take place during the grazing season. It is better to mow for haylage or for the production of grass meal and of highly nutritive granulated and cubed feeds the green mass of grasses set aside for cutting. The production of grass meal and cuttings from grasses grown on irrigated fields is the most expedient from the hygienic viewpoint, for the green mass is processed at a temperature of no less than 150°C and the entire grass mowing operation is mechanized. Furthermore, the grass is mowed before the blooming phase. The grass may be mowed for grass meal and for grass cuttings in the tillering-stalk shooting phase and for haylage in the earing phase. It is better not to make hay on irrigated areas, for the mowed green mass dries out slowly. Its nutritive value is lost and the aftergrowth is delayed.

Under industrial conditions and with waste water irrigation the grass stand shows high productivity essentially over a 10-12 year period, after which grass yields decline. For this reason, the regeneration of pasture land

would be expedient every 10 years. The fields must be leveled for grass regeneration, for the existence of blind furrows and depressions hinders the even distribution of the irrigation water particularly under surface irrigation.

The following grasses respond best to waste water irrigation: awnless brome grass, timothy grass, meadow foxtail, June grass, reed canary grass, English bluegrass, white clover, alfalfa, birdsfoot trefoil, and others; the following grasses prove durable in the case of year-round irrigation: awnless brome grass, timothy grass, June grass, meadow foxtail, and white clover.

The methods such as moling and slotting, aimed at improving the water-air system, are important for mowing and grazing land irrigated with waste water, particularly with grass stands over 4 to 5 years old. Timely grazing and mowing, essentially after the first two grazing cycles are also necessary.

CONT.

→ Research and studies of the used field irrigation systems indicate not only the high effectiveness of the use of waste water in the irrigation of fodder crop land -- raising 7,000 to 10,000 fodder units per hectare -- but the high water retention effect, since each hectare uses up to 6,000-7,000 cubic meters of waste water per year.

→ Computations indicate that factual possibilities for the development of waste water irrigation of fodder crops exist in many parts of our country, totaling an area of 2.6 million hectares, with an annual use of about 13 cubic kilometers of waste water. ←